

WHAT IS CLAIMED IS:

1           1.       A method, comprising:  
2           determining, by a first device, a possibility of an invalidation of a second device,  
3       wherein the first device is coupled to the second device via a fabric;  
4           sending a query from the first device to validate the second device, in response to  
5       determining the possibility of the invalidation of the second device; and  
6           determining, at the first device, whether to continue I/O operations from the first  
7       device to the second device based on receiving a response to the query within a time  
8       period.

1           2.       The method of claim 1, wherein determining, by the first device, the  
2       possibility of the invalidation of the second device, further comprises:  
3           determining whether the first device has received either a notification of a state  
4       change from the fabric or has timed out while waiting for a completion of an I/O  
5       operation sent from the first device to the second device.

1           3.       The method of claim 1, wherein sending the query further comprises:  
2           sending a service frame from the first device to the second device, wherein the  
3       service frame is capable of determining a presence of the second device without  
4       disrupting the I/O operations.

1           4.       The method of claim 3, wherein the service frame is a PDISC Extended  
2       Link Service frame.

1           5.       The method of claim 1, further comprising:  
2           continuing the I/O operations, if the response to the query within the time period  
3       is a frame that validates the World Wide Node Name and the World Wide Port name  
4       associated with a connection to the second device.

1           6.       The method of claim 5, wherein the frame is an LS\_ACC frame.

1           7.       The method of claim 1, further comprising:  
2           terminating a connection from the first device to the second device, if the response  
3           to the query is not received within the time period or if the response is a frame that  
4           indicates that the second device does not consider the first device to be logged in to the  
5           second device.

1           8.       The method of claim 7, wherein the frame is a LOGO frame or a LS\_RJT  
2           frame.

1           9.       The method of claim 1, further comprising:  
2           receiving the query at the second device, prior to determining, at the first device,  
3           whether to continue I/O operations from the first device to the second device;  
4           determining, at the second device, whether the first device is a valid initiator to  
5           the second device; and  
6           sending the response from the second device, wherein the response indicates that  
7           the second device does not consider the first device to be logged in to the second device,  
8           in response to determining that the first device is not the valid initiator to the second  
9           device.

1           10.      The method of claim 1, further comprising:  
2           receiving the query at the second device, prior to determining, at the first device,  
3           whether to continue I/O operations from the first device to the second device;  
4           determining, at the second device, whether the first device is considered to be  
5           logged in to the second device; and  
6           sending the response from the second device, wherein the response indicates that  
7           the second device considers the first device to be logged in to the second device, in  
8           response to determining that the first device is considered to be logged in to the second  
9           device.

1           11.     The method of claim 1, further comprising:  
2           receiving the query at the second device, prior to determining, at the first device,  
3 whether to continue I/O operations from the first device to the second device;  
4           determining, at the second device, whether the first device is considered to be  
5 logged in to the second device; and  
6           sending the response from the second device, wherein the response indicates that  
7 the second device does not consider the first device to be logged in to the second device,  
8 in response to determining that the first device is not considered to be logged in to the  
9 second device.

1           12.     The method of claim 1, wherein the first and second devices are fibre  
2 channel adapters coupled to primary and secondary storage controllers respectively,  
3 wherein the fabric is a switched fabric, and wherein the fibre channel adapters  
4 communicate using extended link services commands.

1           13.     A system, comprising:  
2           a first device;  
3           a fabric, wherein the first device is coupled to the fabric;  
4           a second device coupled the fabric;  
5           means for determining, by the first device, a possibility of an invalidation of the  
6 second device;  
7           means for sending a query from the first device to validate the second device, in  
8 response to determining the possibility of the invalidation of the second device; and  
9           means for determining, at the first device, whether to continue I/O operations  
10 from the first device to the second device based on receiving a response to the query  
11 within a time period.

1           14.     The system of claim 13, further comprising:  
2           an I/O operation sent from the first device to the second device, wherein the  
3 means for determining, by the first device, the possibility of the invalidation of the second

4 device, further performs determining whether the first device has, received either a  
5 notification of a state change from the fabric or has timed out while waiting for a  
6 completion of the I/O operation sent from the first device to the second device.

1 15. The system of claim 13, further comprising:  
2 a service frame that is capable of determining a presence of the second device  
3 without disrupting the I/O operations, wherein the means for sending the query further  
4 performs sending the service frame from the first device to the second device.

1 16. The system of claim 15, wherein the service frame is a PDISC Extended  
2 Link Service frame.

1 17. The system of claim 13, further comprising:  
2 means for continuing the I/O operations, if the response to the query within the  
3 time period is a frame that validates the World Wide Node Name and the World Wide  
4 Port name associated with a connection to the second device.

1 18. The system of claim 17, wherein the frame is an LS\_ACC frame.

1 19. The system of claim 13, further comprising:  
2 means for terminating a connection from the first device to the second device, if  
3 the response to the query is not received within the time period or if the response is a  
4 frame that indicates that the second device does not consider the first device to be logged  
5 in to the second device.

1 20. The system of claim 19, wherein the frame is a LOGO frame or a LS\_RJT  
2 frame.

1 21. The system of claim 13, further comprising:

2 means for receiving the query at the second device, prior to determining, at the  
3 first device, whether to continue I/O operations from the first device to the second device;  
4 means for determining, at the second device, whether the first device is a valid  
5 initiator to the second device; and  
6 means for sending the response from the second device, wherein the response  
7 indicates that the second device does not consider the first device to be logged in to the  
8 second device, in response to determining that the first device is not the valid initiator to  
9 the second device.

1 22. The system of claim 13, further comprising:

2 means for receiving the query at the second device, prior to determining, at the  
3 first device, whether to continue I/O operations from the first device to the second device;  
4 means for determining, at the second device, whether the first device is considered  
5 to be logged in to the second device; and  
6 means for sending the response from the second device, wherein the response  
7 indicates that the second device considers the first device to be logged in to the second  
8 device, in response to determining that the first device is considered to be logged in to the  
9 second device.

1 23. The system of claim 13, further comprising:

2 means for receiving the query at the second device, prior to determining, at the  
3 first device, whether to continue I/O operations from the first device to the second device;  
4 means for determining, at the second device, whether the first device is considered  
5 to be logged in to the second device; and  
6 means for sending the response from the second device, wherein the response  
7 indicates that the second device does not consider the first device to be logged in to the  
8 second device, in response to determining that the first device is not considered to be  
9 logged in to the second device.

1           24.     The system of claim 13, wherein the first and second devices are fibre  
2 channel adapters coupled to primary and secondary storage controllers respectively,  
3 wherein the fabric is a switched fabric, and wherein the fibre channel adapters  
4 communicate using extended link services commands.

1           25.     An article of manufacture, wherein the article of manufacture is capable of  
2 causing operations, the operations comprising:  
3           determining, by a first device, a possibility of an invalidation of a second device,  
4 wherein the first device is coupled to the second device via a fabric;  
5           sending a query from the first device to validate the second device, in response to  
6 determining the possibility of the invalidation of the second device; and  
7           determining, at the first device, whether to continue I/O operations from the first  
8 device to the second device based on receiving a response to the query within a time  
9 period.

1           26.     The article of manufacture of claim 25, wherein determining, by the first  
2 device, the possibility of the invalidation of the second device, further comprises:  
3           determining whether the first device has received either a notification of a state  
4 change from the fabric or has timed out while waiting for a completion of an I/O  
5 operation sent from the first device to the second device.

1           27.     The article of manufacture of claim 25, wherein sending the query further  
2 comprises:  
3           sending a service frame from the first device to the second device, wherein the  
4 service frame is capable of determining a presence of the second device without  
5 disrupting the I/O operations.

1           28.     The article of manufacture of claim 27, wherein the service frame is a  
2 PDISC Extended Link Service frame.

1           29.     The article of manufacture of claim 25, the operations further comprising:  
2           continuing the I/O operations, if the response to the query within the time period  
3           is a frame that validates the World Wide Node Name and the World Wide Port name  
4           associated with a connection to the second device.

1           30.     The article of manufacture of claim 29, wherein the frame is an LS\_ACC  
2           frame.

1           31.     The article of manufacture of claim 25, the operations further comprising:  
2           terminating a connection from the first device to the second device, if the response  
3           to the query is not received within the time period or if the response is a frame that  
4           indicates that the second device does not consider the first device to be logged in to the  
5           second device.

1           32.     The article of manufacture of claim 31, wherein the frame is a LOGO  
2           frame or a LS\_RJT frame.

1           33.     The article of manufacture of claim 25, the operations further comprising:  
2           receiving the query at the second device, prior to determining, at the first device,  
3           whether to continue I/O operations from the first device to the second device;  
4           determining, at the second device, whether the first device is a valid initiator to  
5           the second device; and  
6           sending the response from the second device, wherein the response indicates that  
7           the second device does not consider the first device to be logged in to the second device,  
8           in response to determining that the first device is not the valid initiator to the second  
9           device.

1           34.     The article of manufacture of claim 25, the operations further comprising:  
2           receiving the query at the second device, prior to determining, at the first device,  
3           whether to continue I/O operations from the first device to the second device;

4           determining, at the second device, whether the first device is considered to be  
5   logged in to the second device; and  
6           sending the response from the second device, wherein the response indicates that  
7   the second device considers the first device to be logged in to the second device, in  
8   response to determining that the first device is considered to be logged in to the second  
9   device.

1           35.    The article of manufacture of claim 25, the operations further comprising:  
2           receiving the query at the second device, prior to determining, at the first device,  
3   whether to continue I/O operations from the first device to the second device;  
4           determining, at the second device, whether the first device is considered to be  
5   logged in to the second device; and  
6           sending the response from the second device, wherein the response indicates that  
7   the second device does not consider the first device to be logged in to the second device,  
8   in response to determining that the first device is not considered to be logged in to the  
9   second device.

1           36.    The article of manufacture of claim 25, wherein the first and second  
2   devices are fibre channel adapters coupled to primary and secondary storage controllers  
3   respectively, wherein the fabric is a switched fabric, and wherein the fibre channel  
4   adapters communicate using extended link services commands.